

What is claimed is:

1. A hydrogen storage alloy in which a eutectic mixture in powder form of a hydrogen storage alloy material with a hydrogen absorbing material is mixed with a viscous substance to form a paste.

2. A hydrogen storage alloy unit comprising:

a heat exchange chamber through which a heating medium source circulates;

a pair of hydrogen chambers formed on both sides of the heat exchange

chamber; and

hydrogen storage alloy pipe groups, one end portion of which imports into the pair of hydrogen chambers, and whose other end portion extends in a free state into the heat exchange chamber, and that form a pair whose one end portions that are on the side of the pair of hydrogen chambers are each fixed on that side,

wherein the hydrogen storage alloy pipe groups comprise hydrogen storage alloy pipes provided a hydrogen storage alloy inside,

the free end portion on the heat exchange chamber side of the hydrogen storage alloy pipe is closed off, and

hydrogen circulation holes are opened in the end portions on the hydrogen

chamber sides of the hydrogen storage alloy pipe.

3. A hydrogen storage alloy unit according to claim 2, wherein the hydrogen storage alloy pipes that form a pair are arranged in a honeycomb pattern.

4. A hydrogen storage alloy unit according to claim 2, wherein hydrogen storage alloys

of the hydrogen storage alloy pipes that form a pair each have a different dissociation pressure.

5. A hydrogen storage alloy unit according to claim 2, wherein the hydrogen storage alloy pipes that form a pair each comprising:

a pound material formed by a porous material that has the hydrogen circulation holes in a central portion thereof; and

a hydrogen storage alloy paste hardened after being inserted in a paste form between the pound material and an outer pipe.

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6. A hydrogen storage alloy unit according to claim 2, wherein carbon fiber or carbide fiber is wrapped around an outer circumference of the hydrogen storage alloy pipes.

7. A heat pump comprising:

15 a first hydrogen storage alloy apparatus provided with a first hydrogen storage alloy having a predetermined dissociation pressure;

a second hydrogen storage alloy apparatus provided with a second hydrogen storage alloy having a dissociation pressure that is higher than that of the first hydrogen storage alloy;

20 a third hydrogen storage alloy apparatus provided with a third hydrogen storage alloy having a dissociation pressure that is higher than that of the second hydrogen storage alloy; and

a fourth hydrogen storage alloy apparatus provided with a fourth hydrogen storage alloy having a dissociation pressure that is higher than that of the third hydrogen storage alloy;

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wherein the second hydrogen storage alloy apparatus and the third hydrogen storage alloy apparatus form a single unit, and

the unit comprising:

5 a first hydrogen storage alloy pipe group that has the second hydrogen storage alloy;

a first hydrogen chamber in which one end of the first hydrogen storage alloy pipes are fixed;

a second hydrogen storage alloy pipe group that has the third hydrogen storage alloy; and

10 a second hydrogen chamber in which one end of the second hydrogen storage alloy pipes are fixed;

wherein another end of the second hydrogen storage alloy pipes and another end of the third hydrogen storage alloy pipes are placed inside a common heat exchange chamber;

15 the first hydrogen storage alloy apparatus is connected to one of the second hydrogen storage alloy apparatus and the third hydrogen storage alloy apparatus;

the fourth hydrogen storage alloy apparatus is connected to the other of the second hydrogen storage alloy apparatus and the third hydrogen storage alloy apparatus; and

20 the first hydrogen storage alloy apparatus and the fourth hydrogen storage alloy apparatus each cause hydrogen to be transported to the unit as a result of one of the first through fourth hydrogen absorption apparatuses being heated or cooled.

8. A heat pump according to claim 7, wherein the second hydrogen storage alloy apparatus and the fourth hydrogen storage alloy apparatus are connected via a pump that

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is able to transport hydrogen from the fourth hydrogen storage alloy apparatus to the second hydrogen storage alloy apparatus.

9. A heat pump according to claim 7, wherein carbon fiber or carbide fiber is wrapped  
5 around an outer circumference of the hydrogen storage alloy pipes.

10. A heat pump comprising:

a first hydrogen storage alloy apparatus provided with a first hydrogen storage alloy having a predetermined dissociation pressure;

10 a second hydrogen storage alloy apparatus provided with a second hydrogen storage alloy having a dissociation pressure that is lower than that of the first hydrogen storage alloy;

a third hydrogen storage alloy apparatus provided with a third hydrogen storage alloy having a dissociation pressure that is lower than that of the first hydrogen storage  
15 alloy; and

a fourth hydrogen storage alloy apparatus provided with a fourth hydrogen storage alloy having a dissociation pressure that is lower than that of the first hydrogen storage alloy;

20 wherein the first hydrogen storage alloy apparatus and the second hydrogen storage alloy apparatus form a first system connected by a pump unit,

the third hydrogen storage alloy apparatus and the fourth hydrogen storage alloy apparatus form a second system connected by the pump unit,

in the first and second systems, by heating or cooling one hydrogen storage alloy apparatus and also operating the pump unit, hydrogen is transported in mutually opposite  
25 directions between the first hydrogen storage alloy apparatus and the second hydrogen

storage alloy apparatus and between the third hydrogen storage alloy apparatus and the fourth hydrogen storage alloy apparatus.

11. A hydrogen compression apparatus comprising:

5 a hydrogen storage alloy apparatus provided with a hydrogen storage alloy formed by mixing a viscous substance with a eutectic mixture in powder form of a hydrogen storage alloy material and a hydrogen absorbing material, and that is capable of transferring heat between itself and a heating medium source; and

10 a hydrogen storage container connected to the hydrogen storage alloy apparatus via a pump,

wherein, by heating the hydrogen storage alloy apparatus using the heating medium source and by also operating the pump such that hydrogen is transported from the hydrogen storage alloy apparatus to the hydrogen storage container, hydrogen can be stored under pressure in the hydrogen storage container.

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12. A hydrogen compression apparatus comprising:

a hydrogen storage alloy apparatus having a hydrogen storage alloy;

a first pressure container and a second pressure container each switchably connected to the hydrogen storage alloy apparatus;

20 a pump that is capable of transporting a fluid and connected to both the first pressure container and the second pressure container; and

a hydrogen storage container connected to both the first pressure container and the second pressure container,

25 wherein hydrogen is stored under pressure in the hydrogen storage container by operating the pump such that hydrogen discharged from the hydrogen storage alloy when

the hydrogen storage alloy apparatus is heated is transported to one of the first pressure container and the second pressure container, and fluid is transported from the one of the first pressure container and the second pressure container to which the hydrogen was transported to the other side.